

**What is claimed is:**

1. A frequency division duplex point-to-multipoint communications system that divides a frequency allocation into two bands, a downlink band that carries communications from a central station to multiple stations, and an uplink band that carries communications from multiple  
5 stations to the central station, the system comprising:

a carrier generator generating a plurality of carriers within each of said bands, each of said carriers being in a spaced relationship to the other carriers such that each said band is sub-divided into a plurality of sub-bands that are equal in number to the plurality of carriers and each of said plurality of sub-bands having a respective carrier of said plurality of carriers,

10 a time multiplexer dividing each of said sub-bands by time-multiplexing into a plurality of frames,

said time multiplexer also dividing each frame into  $N$  time-slots, and

a switching device assigning a series of time-slots that occur periodically, every  $N$  time-slots, once per frame, to form channels for communication between said central station and said  
15 multiple stations.

2. The system of claim 1, wherein carrier and channel assignments are unidirectional.

3. The system of claim 1, wherein duplex communication is carried out by assigning one or more uplink channels and one or more downlink channels.

4. The system of claim 1, wherein each carrier has a frequency hopping pattern.

20 5. The system of claim 1, wherein control is mapped to unidirectional channels.

6. The system of claim 5, wherein control channel messages are transmitted in one burst via said unidirectional channels.

7. The system of claim 5, wherein the uplink and downlink control channel messages are each transmitted in a block consisting of multiple bursts, respectively.

25 8. The system of claim 1, wherein traffic is mapped to unidirectional channels.

9. The system of claim 1, wherein the assignment of uplink carriers and time slots is done through control messages that are transmitted only to the station to which the uplink traffic channels are to be assigned.

10. The system of claim 1, wherein the assignment of downlink carriers and time slots is  
30 done through control messages that are transmitted only to the station to which the downlink traffic channels are to be assigned.

11. The system of claim 1, wherein the assignment of uplink control traffic channels is done through control messages that are transmitted only to the station to which the uplink control channels are to be assigned.

5 12. The system of claim 1, wherein the assignment of downlink control channels is done through control messages that are transmitted only to the station to which the downlink control channels are to be assigned.

13. The system of claim 1, wherein each station may have one or more communication sessions assigned with independent throughput, error, and delay characteristics.

10 14. The system of claim 1, wherein each communication session is associated with different protocols or protocol modes at one or more layers of its protocol stack.

15. The system of claim 1, wherein a communication session is assigned resources only in the direction that there is data to be transmitted.

16. The system of claim 15, wherein a communication session is assigned resources only when there is data to be transmitted.

15 17. The system of claim 16, wherein an uplink slow associated control channel is assigned along with an uplink traffic channel.

18. The system of claim 17, wherein an uplink periodic reserved control channel is assigned to provide the same function as the uplink slow associated control channel during periods when there is no uplink traffic channel assigned.

20 19. The system of claim 16, wherein a downlink slow associated control channel is assigned along with a downlink traffic channel.

20. The system of claim 19, wherein a downlink periodic reserved control channel is assigned to provide the same function as the downlink slow associated control channel during periods when there is no downlink traffic channel assigned.

25 21. The system of claim 1, further comprising a fast associated control channel that has a higher priority and may pre-empt traffic on the traffic channel.

22. The system of claim 21, wherein the fast associated control channel message is transmitted over one burst.

30 23. The system of claim 21, wherein the fast associated control channel message is transmitted over multiple bursts.

24. The system of claim 1, wherein continuity of periodic control channels across speech talkspurt and silence periods for conversational voice also carry channel quality feedback information.

25. The system of claim 24, wherein said periodic control channels further carry signal measurement reports.

26. The system of claim 25, wherein said periodic control channels further carry noise information.

5        27. The system of claim 1, wherein uplink and downlink bands are of unequal size.

28. The system of claim 27, wherein a number of carriers in the uplink band is different than a number of carries in the downlink band.

29. A frequency division duplex point-to-point communications system that divides a frequency allocation into two bands, a downlink band that carries communications from a central station to multiple stations, and an uplink band that carries communications from a mobile station to the central station, the system comprising:

15        a carrier generator generating a plurality of carriers within each of said bands, each of said carriers being in a spaced relationship to the other carriers such that each said band is subdivided into a plurality of sub-bands that are equal in number to the plurality of carriers and each of said plurality of sub-bands having a respective carrier of said plurality of carriers,

      a time multiplexer dividing each of said sub-bands by time-multiplexing into a plurality of frames,

      said time multiplexer also dividing each frame into  $N$  time-slots, and

20        a switching device assigning a series of time-slots that occur periodically, every  $N$  time-slots, once per frame, to form a channel for messages between said central station and said mobile station.